

Name: \_\_\_\_\_

## at1119paper: Complete the Square, $b = \text{odd}$ (v505)

### Example

By completing the square, find both solutions to the given equation:

$$x^2 - 47x = -396$$

Add  $\left(\frac{-47}{2}\right)^2$ , which equals  $\frac{2209}{4}$ , to both sides of the equation.

$$x^2 - 47x + \frac{2209}{4} = \frac{625}{4}$$

Factor the left side.

$$\left(x + \frac{-47}{2}\right)^2 = \frac{625}{4}$$

Undo the squaring.

$$\begin{array}{lll} x + \frac{-47}{2} = \frac{-25}{2} & \text{or} & x + \frac{-47}{2} = \frac{25}{2} \\ x = \frac{47 - 25}{2} & \text{or} & x = \frac{47 + 25}{2} \\ x = 11 & \text{or} & x = 36 \end{array}$$

### Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 33x = 1798$$

$$x^2 + 33x + \frac{1089}{4} = \frac{8281}{4}$$

$$\left(x + \frac{33}{2}\right)^2 = \frac{8281}{4}$$

$$\begin{array}{lll} x + \frac{33}{2} = \frac{-91}{2} & \text{or} & x + \frac{33}{2} = \frac{91}{2} \\ x = \frac{-33 - 91}{2} & \text{or} & x = \frac{-33 + 91}{2} \\ x = -62 & \text{or} & x = 29 \end{array}$$

## Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 31x = 1092$$

$$x^2 + 31x + \frac{961}{4} = \frac{5329}{4}$$

$$\left(x + \frac{31}{2}\right)^2 = \frac{5329}{4}$$

$$x + \frac{31}{2} = \frac{-73}{2}$$

or

$$x + \frac{31}{2} = \frac{73}{2}$$

$$x = \frac{-31 - 73}{2}$$

or

$$x = \frac{-31 + 73}{2}$$

$$x = -52$$

or

$$x = 21$$

## Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 45x = -164$$

$$x^2 + 45x + \frac{2025}{4} = \frac{1369}{4}$$

$$\left(x + \frac{45}{2}\right)^2 = \frac{1369}{4}$$

$$x + \frac{45}{2} = \frac{-37}{2}$$

or

$$x + \frac{45}{2} = \frac{37}{2}$$

$$x = \frac{-45 - 37}{2}$$

or

$$x = \frac{-45 + 37}{2}$$

$$x = -41$$

or

$$x = -4$$